

**CLAIMS**

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

- 1        1. A method of image compression comprising the steps of:
  - 2                analyzing an image in terms of perceptual constructs of the human visual system;
  - 4                searching for patterns among analyzed abstractions of the image;
  - 5                describing the image in terms of the perceptual constructs and the patterns found among them;
  - 7                for a given image that is in a same “class” as the image, re-representing the image by describing the image as a collection of parameterized versions of the patterns prevalent in that class of image;
  - 10              taking a resulting description outside of the context of abstract patterns; and
  - 12              looking for redundancies in the description, then re-representing the data so as to eliminate the redundancies and thereby compress the description.
- 1        2. The method of image compression recited in claim 1, wherein the patterns identified, image components, parameterization of patterns, and lower level numerical encodings are all designed around images belonging to a narrow class of images.
- 1        3. The method of image compression recited in claim 2, wherein the narrow class of images are two-dimensional projections of three-dimensional visualizations of data generated by numerical weather simulations.

1       4. The method of image compression recited in claim 1, wherein the images  
2       are of the class exemplified by 2-D projections of 3-D weather model images,  
3       said method further comprising the steps of:

4              re-representing entities with smoothly curved borders and an interior  
5              fill that can be parameterized and is either largely derivable from other image  
6              data or constant, as curve sequences and parameters required to describe the  
7              interior; and

8              re-representing entity groups with constant structure that vary only in  
9              terms of a spatial parameter as references to the entity group, and a list of the  
10             values for the required parameters, each value being for each subsequent entity  
11             for the group.

1       5. The method of image compression recited in claim 4, wherein the spatial  
2       parameter is orientation or color.

1       6. A method of compression of two-dimensional projections of three-  
2       dimensional visualizations of image data comprising the steps of:

3              inputting a two-dimensional image;  
4              dismantling the two-dimensional image into components;  
5              tracing contours by fitting parametric curves their borders;  
6              tracing iso-surface projections by fitting curves to their borders;  
7              representing numerical values of curve nodes as distances from one  
8              another or a local origin; and  
9              storing compact border and color description of contours and compact  
10             border and color description of iso-surfaces.

1       7. The method of compression of two-dimensional projections of three-  
2       dimensional visualizations of image data recited in claim 6, wherein the data

3 are generated by numerical weather simulations.

1 8. The method of compression of two-dimensional projections of three-  
2 dimensional visualizations of image data recited in claim 7, wherein the step  
3 of dismantling the input image into components includes separation of solid  
4 filled contours, transparent, shaded colored two-dimensional projections of  
5 three-dimensional iso-surfaces, arrow color and orientations in three-  
6 dimensional space, and text and further comprising the steps of:

7 representing numerical values of arrow colors and orientations as  
8 differences; and

9 storing compact color and orientation information for arrows and  
10 separated text.

1 9. The method of compression of two-dimensional projections of three-  
2 dimensional visualizations of image data recited in claim 8, further comprising  
3 the steps of:

4 receiving the compact border and color description of contours, the  
5 compact border and color description of iso-surfaces, the compact color and  
6 orientation information for arrows, and text; and

7 decompressing the received information to generate a representation of  
8 the original two-dimensional image.

1 10. The method of compression of two-dimensional projections of three-  
2 dimensional visualizations of image data recited in claim 9, wherein the step  
3 of decompressing comprises the steps of:

4 accessing a static background image representing geography and  
5 drawing the background;

6 accessing a static description of arrow locations and skew, structure

7 and definition of an arrow, and received compact color and orientation  
8 information for arrows and drawing arrows;  
9 accessing structure and definition of an iso-surface and received  
10 compact border and color description of iso-surfaces and drawing iso-surfaces;  
11 accessing structure and definition of a contour and received compact  
12 border and color descriptions of contours and drawing color contours; and  
13 accessing received text and drawing text.